What is claimed is:

1. A perpendicular magnetic recording disk comprising:

a substrate;

a laminated underlayer on the substrate, the underlayer comprising a laminate of first and second ferromagnetic layers and a nonferromagnetic spacer layer between and in contact with the two ferromagnetic layers, the two ferromagnetic layers being exchange coupled antiferromagnetically across the spacer layer, whereby the magnetic moments of the two ferromagnetic layers are antiparallel; and

a magnetic recording layer of material having perpendicular magnetic anisotropy on the laminated underlayer.

2. The disk of claim 1 further comprising an exchange break layer between the underlayer and the magnetic recording layer for preventing magnetic exchange coupling between the ferromagnetic layers of the laminated underlayer and the magnetic recording layer.

3. The disk of claim 2 wherein the exchange break layer is formed of material consisting essentially of titanium.

4. The disk of claim 2 wherein the exchange break layer is formed of material selected from the group consisting of Si, Ge, SiGe alloys, Cr, Ru, W, Zr, Nb, Mo, V, Al, CrTi, NiP, CN_x, CH_x ,C, and oxides, nitrides and carbides of an element selected from the group consisting of Si, Al, Zr, Ti, and B.

5. The disk of claim 1 wherein the ferromagnetic layers of the underlayer are formed of an alloy comprising cobalt and iron.

6. The disk of claim 6 wherein the cobalt-iron alloy includes an element selected from the group consisting of nickel, boron and copper.

7. The disk of claim 1 wherein the ferromagnetic layers of the underlayer are formed of a material selected from the group consisting of alloys of CoFe, CoNiFe, NiFe, FeCoB, CoCuFe, FeAlSi, FeTaN, FeN, FeTaC, CoTaZr and CoZrNb.

8. The disk of claim 1 wherein the spacer layer of the underlayer is formed of a material selected from the group consisting of ruthenium (Ru), chromium (Cr), rhodium (Rh), iridium (Ir), copper (Cu), and their alloys.

9. The disk of claim 8 wherein the spacer layer of the laminated underlayer is Ru.

10. The disk of claim 1 further comprising a layer of antiferromagnetic material between the substrate and the first ferromagnetic layer for pinning the magnetization direction of the first ferromagnetic layer.

11. The disk of claim 1 wherein the antiferromagnetic material is a material selected from the group consisting of FeMn, NiMn, PtMn, IrMn, PdPtMn and NiO.

12. The disk of claim 1 further comprising a second nonferromagnetic spacer layer on the second ferromagnetic layer and a third ferromagnetic layer on the second spacer layer, the second and third ferromagnetic layers being exchange-coupled antiferromagnetically across the second spacer layer, whereby the magnetic moments of the second and third ferromagnetic layers are antiparallel.

13. The disk of claim 1 wherein the magnetic moments of the two ferromagnetic layers are oriented generally radially on the disk.

14. The disk of claim 1 wherein the magnetic moments of the two ferromagnetic layers are oriented generally circumferentially on the disk.

15. A perpendicular magnetic recording disk having a generally circular shape and comprising:

a substrate;

a laminated underlayer on the substrate, the underlayer comprising N ferromagnetic layers and N-1 nonferromagnetic spacer layers, wherein N is greater than or equal to 2, each of the spacer layers being located between and in contact with two adjacent ferromagnetic layers and having a thickness sufficient to induce antiferromagnetic exchange coupling across said adjacent ferromagnetic layers, whereby the magnetic moments of adjacent ferromagnetic layers are oriented generally antiparallel in the absence of an applied magnetic field, said magnetic moments being aligned in a generally radial direction on the disk in the absence of an applied magnetic field; and

a magnetic recording layer of material having perpendicular magnetic anisotropy on the laminated underlayer.

16. A disk according to claim 15 wherein the ferromagnetic layers in the underlayer other than the bottom and top ferromagnetic layers have substantially the same thickness t_{fm}, wherein the top ferromagnetic layer has a thickness t_{top} and wherein $(t_{fm} - t_{top})/t_{fm}$ approximately equals 1/2.

17. The disk of claim 15 further comprising an exchange break layer between the laminated underlayer and the magnetic recording layer for preventing magnetic exchange coupling between the ferromagnetic layers of the laminated underlayer and the magnetic recording layer.

18. The disk of claim 17 wherein the exchange break layer is formed of material consisting essentially of titanium.

19. The disk of claim 17 wherein the exchange break layer is formed of material selected from the group consisting of Si, Ge, SiGe alloys, Cr, Ru, W, Zr, Nb, Mo, V, Al, CrTi, NiP, CN_x, CH_x ,C, and oxides, nitrides and carbides of an element selected from the group consisting of Si, Al, Zr, Ti, and B.

20. The disk of claim 15 wherein the ferromagnetic layers of the laminated underlayer are formed of an alloy comprising cobalt and iron.

21. The disk of claim 20 wherein the cobalt-iron alloy includes an element selected from the group consisting of nickel, boron and copper.

22. The disk of claim 15 wherein the ferromagnetic layers of the laminated underlayer are formed of a material selected from the group consisting of alloys of CoFe, CoNiFe, NiFe, FeCoB, CoCuFe, FeAlSi, FeTaN, FeN, FeTaC, CoTaZr and CoZrNb.

23. The disk of claim 15 wherein the spacer layers of the laminate underlayer are formed of a material selected from the group consisting of ruthenium (Ru), chromium (Cr), rhodium (Rh), iridium (Ir), copper (Cu), and their alloys.

24. The disk of claim 15 wherein the spacer layers of the laminated underlayer are Ru.

25. The disk of claim 15 further comprising a layer of antiferromagnetic material between the substrate and the first ferromagnetic layer of the laminated underlayer for pinning the magnetization direction of the first ferromagnetic layer.

26. The disk of claim 25 wherein the antiferromagnetic material is a material selected from the group consisting of FeMn, NiMn, PtMn, IrMn, PdPtMn and NiO.